Hypothesis testng

1. Explain the following along with examples (i)Unbiased test ii. Uniformly most powerful unbiased test iii.Optimal Test (iv) Locally Best Test (v)Tests Under Restricted Alternatives (vi)Similar Region test vii. NeymanStructure, (viii) Most Powerful Similar Region (MPSR) Test, (ix)Uniformly most Powerful Similar Region(UMPSR) Test

   N.B.: Go through the book by Ashraf ali sir(pp. 234-260) and 4. Testing of hypothesis.doc 3. Testing of hypothesis.doc 8. Hypothesis-1.doc

2. Given the frequency function:

$$f(x,\theta) = \begin{cases} \frac{1}{\theta}, & 0 \le x \le \theta \\ 0, & elsewhere \end{cases}$$

And that you are testing the null hypothesis $H_0: \theta = 1$ against $H_1: \theta = 2$ by means of a single observed value of x. What would be the size of the type I and type II errors, if you chose the interval $(i) 0.5 \le x,\ (ii) 1 \le x \le 1.5$ as the critical region? Also obtain the power function of the test.

3. If $x \ge 1$ is the critical region for testing $H_0: \theta = 2$ against the alternative hypothesis $H_0: \theta = 1$, on the basis of single observation from the population,

$$f(x,\theta) = \theta \exp(-\theta x), \qquad 0 \le x \le \infty$$

Obtain the values of type I and type II errors, also the power function of the test.

4. Let p be the probability that a coin will fall head in asingle toss in order to test $H_0: p = \frac{1}{2}$ against $H_1: p = \frac{3}{4}$. The coin is tossed 5 times and H_0 is rejected if more than 3 heads are obtained. Find the probability of type I error and power of the test.

5. Let X have a p.d.f. of the form:

$$f(x,\theta) = \begin{cases} \frac{1}{\theta} e^{-\frac{x}{\theta}}, & 0 < x < \infty, \theta > 0 \\ 0, & elsewhere \end{cases}$$

To test $H_0: \theta = 2$ against $H_1: \theta = 1$, use the random sample $x_1, x_2$of size 2 and define a critical region: $W = \{(x_1, x_2): 9.5 \le x_1 + x_2\}$

Find: (i) Power of the test & (ii)Significance level of the test

6. Obtain the BCR using Neyman-Pearson lemma for the testing $\theta = \theta_0$ against $\theta = \theta_1 > \theta_0$ and $\theta = \theta_1 < \theta_0$, in the case of a normal population $N(\theta, \sigma^2)$, where σ^2 is known. Hence find the power of the test.
7. Let $x_1, x_2, \cdots, x_n$ are drawn from $N(0, \theta)$; $\theta = \sigma^2$. Show that there will exist a UMP test for testing simple $H_0 : \theta = \theta_0$ against $H_1 : \theta > \theta_0$ with size α .

8. Let $x_1, x_2, \cdots, x_n$ denote a random sample from $N(\theta, 1)$. Show that there is no UMP test for testing $H_0 : \theta = \theta_0$ against $H_1 : \theta \neq \theta_0$.

9. What are the methods of constructing test. Explain Union-Intersection test with an example.
10. Explain Intersection-Union test with an example.
11. Explain the relationship between Likelihood Ratio Test and Intersection-Union teast.

12. Explain: (i)Sobel's test, (ii)Lagrange Multiplier test or Score test and (iii)Armitage test.

[look LagrangeMultipliersHandbook_of_Econ__II___Engle.pdf file M1.zip folder]